

We claim:

1. A molecular beacon comprising a quantum dot attached to a first end of at least one nucleic acid molecule having a probe and forms a stem-loop structure in the absence of a target sequence hybridized thereto and a quencher attached to a second end of the nucleic acid molecule.
2. The molecular beacon of claim 1, wherein the quantum dot is a ZnS capped CdSe quantum dot.
3. The molecular beacon of claim 1, wherein the quencher is an organic quencher.
4. The molecular beacon of claim 1, wherein the quencher is DABCYL.
5. The molecular beacon of claim 1, wherein the quencher is a gold substrate.
6. The molecular beacon of claim 1, wherein the quantum dot is a ZnS capped CdSe quantum dot and the quencher is DABCYL.
7. The molecular beacon of claim 1, wherein the quantum dot is a ZnS capped CdSe quantum dot and the quencher is a gold substrate.
8. The molecular beacon of claim 1, wherein the quantum dot has two or more nucleic acid molecules having a probe and forms a stem-loop structure in the absence of a target sequence hybridized thereto and a quencher attached to a second end of the nucleic acid molecule.
9. The molecular beacon of claim 8, wherein the nucleic acid molecules are attached to the quantum dot in a pattern.
10. The molecular beacon of claim 8, wherein the nucleic acid molecules may be the same or different.
11. The molecular beacon of claim 8, wherein the probes may be the same or different.

12. The molecular beacon of claim 8, wherein the quantum dot may be the same or different.
13. The molecular beacon of claim 8, wherein the quencher may be the same or different.
14. The molecular beacon of claim 8, wherein at least one quantum dot is a ZnS capped CdSe quantum dot.
15. The molecular beacon of claim 8, wherein at least one quencher is DABCYL or a gold substrate.
16. The molecular beacon of claim 8, wherein at least one quantum dot is a ZnS capped CdSe quantum dot and at least one quencher is DABCYL or a gold substrate.
17. The molecular beacon of claim 1, wherein the quantum dot and the quencher are operably linked, wherein in the absence of the target sequence hybridized thereto, the quencher quenches the quantum dot signal.
18. A molecular beacon array comprising a plurality of the molecular beacon of claim 1.
19. A molecular beacon array comprising a plurality of the molecular beacon of claim 8.
20. A kit comprising the molecular beacon of claim 1 and instructional material.
21. A kit comprising the molecular beacon of claim 8 and instructional material.